

REMARKS

Claims 10-29 are pending in the application. By this Amendment, claims 1-9 are cancelled, and claims 10-29 are added.

I. Formal Matters

The Office Action objects to the specification because of various informalities. Enclosed herewith is a substitute specification, as well as a mark-up of the originally filed specification to show where the changes have been made. The Examiner is requested to replace the originally filed specification with the enclosed substitute specification. No new matter has been added.

The Office Action rejects claims 1-9 under 35 U.S.C. §112, second paragraph, as allegedly indefinite. By this Amendment, claims 1-9 have been cancelled. Thus, this rejection is moot.

II. Art Rejections

The Office Action rejects claims 1-9 under 35 U.S.C. §102(b) over Neckel (U.S. Patent No. 2,224,606). As noted above, claims 1-9 have been cancelled. Thus, this rejection is moot.

III. New Claims 10-29

By this Amendment, Applicant has added new claims 10-29 to the application. New claims 10 and 22 are independent claims directed to a multistacker. Claims 11-21 depend from claim 10, and claims 23-29 depend from claim 22.

It is respectfully submitted that independent claims 10 and 22 recite features that are neither shown nor suggested by the references of record. For instance, none of references of record disclose a multistacker which includes a movement plate and a plurality of tray plates

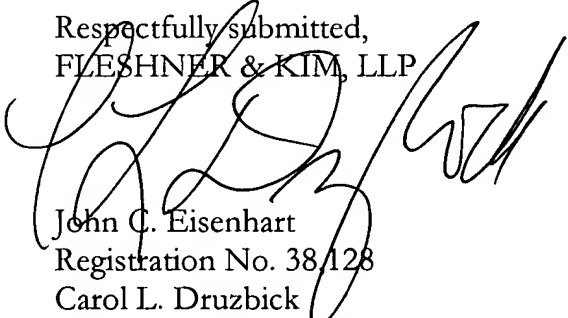
stacked on the movement plate, as recited in claims 10 and 22. Dependent claims 11-21 and 23-29 are allowable for at least the same reasons, and for the additional features they recite.

IV. Conclusion

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. If the Examiner believes that any additional changes would place the application in better condition for allowance, the Examiner is invited to contact the undersigned attorney, John C. Eisenhart, at the telephone number listed below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this, concurrent and future replies, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
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Enclosures:

Mark-up of Original Specification
Substitute Specification

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Date: March 26, 2002

TITLE OF THE INVENTION

MULTI-STACKER ^{FOR A} ~~OF~~ HANDLER



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BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a multi-stacker ^{for} ~~of~~ a handler for classifying and stacking a test tray served with a device tested by ^{the test} ~~the test~~ and ^{more} ~~more~~ particularly to a multi-stacker ^{for} ~~of~~ a handler in which, after a device served in a test tray is ^{a tested} ~~contacted~~ with a test of a test site ^{to be tested} ~~to be tested~~ and is classified ^{to be served on} ~~to be served on~~ each test tray according to the classification ^{for unloading} ~~for unloading~~. ^{the present invention relates} ^{is unloaded}

Description of the Prior Art

In general, a ^{produced by a} ~~produced~~ device ^{in the} ~~in the~~ manufacturing process is, in regular sequence, fed by an elevator of a horizontal or vertical handler to ^{be tested by} ~~be tested by~~ a tester.

As the result of ^{testing} ~~test~~ ^{the good} ~~the good~~ device is ^{devices are} ~~separated from~~ ^{the bad} ~~the bad~~ device so that ^{to be tested} ~~the only good device is~~ ^{device are} ~~outputted~~.

A ^{whose} ~~The~~ device ^{is to be tested} ~~for being tested~~ its ^{performance} ~~performance~~ is ^{is to be tested} ~~served~~ in a test tray ^{moved to a test position} ~~to move~~ toward a test portion and is contacted with a tester ^{to be tested} ~~to be tested~~.

At this time, the tested device is classified according to a classification and the classified device is again classified ^{as it is} ~~to be~~ unloaded by a multi-stacker. ^{includes} ~~an unloading base plate, which is secured to the conventional handler frame 10 by~~

As shown in Figs. 1 and 2, a conventional handler frame 10 ^{is} ~~is~~ at the upper portion thereof, ^{space} ~~secured with~~ a plurality of mount brackets 108. ^{extends} ~~An~~ ^{includes} ~~The~~ unloading base plate 104 ^{formed} ~~longitudinally~~ with a long-hole 106 ^{therein} ~~therein~~ ^{is disposed} ~~is disposed~~ ^{perpendicularly} ~~perpendicularly~~ to the handler frame 10 ^{by the mount bracket 108} ~~by the mount bracket 108~~. ^{Furthermore,} ~~the~~ long hole 106 of the unloading base plate 10 ^{is inserted with one end of the tray plate 110 to be placed the test tray thereon and is inserted with a plurality of tray plates 110,} ~~is inserted with one end of the tray plate 110 to be placed the test tray thereon and is inserted with a plurality of tray plates 110,~~ in regular sequence, at a predetermined portion therefrom.

^{Each} ~~The~~ tray plate 110 is provided with a plurality of pins 118 so that the test tray ¹¹⁰ ~~is~~ correctly placed thereon. The tray plate 110 ^{is} ~~is~~, at one side thereof, ^{includes} ~~formed with~~ a tray guide 116 ^{to be placed with the test tray without movement} ~~to be placed with the test tray without movement~~.

[Furthermore, the ^{The} tray plate 110 is, at the ^{a lower} lowest portion thereof, ^{further provided} installed with a belt bracket ¹²⁰ thereby to move up/down by the ^a belt (not shown) ^{which is moved up and down} on a back side of [Furthermore, a pulley bracket 122 is installed (at) the unloading base plate 104 [on the belt bracket 120]. The pulley bracket 122 ^{includes} is installed with a shaft 126 coupled with a pulley 124 ^{which is moved} to move by a motor (not shown). [Therefore, the pulley 124 coupled to the shaft 126 is rotated according to the rotation of the motor so that the belt (not shown) wound ^{around} to the pulley 124 is rotated [hereby] to move [up/down] the belt bracket 120. Accordingly, the tray ^{plates} plate 110 ^{are moved up and down} moves up/down.]

[Meanwhile, a ^A stopper base 128 is installed at the ^a lower portion of the pulley bracket 122. [The pulley bracket 122 is installed at the outside of the unloading base plate 104.] The stopper base 128 is, at the ^a right ^{side} portion thereof, ^{provided} secured with a cylinder 132 [to move up/down]. [The ^A stopper 130 is the right side thereof,] connected to the lower end of the cylinder 132 [secured to the stopper base 128]. [The tray plates 110 moves up/down by the belt not shown rotating by the rotating power from the motor.]

[At this time, ^{The} "┐"-shaped stopper 130 is, ^{on a} at the left end thereof, formed with a PAW to control a rising height when the tray ^{plates} plate 110 ^{are moved in an upward direction} moves up. [Furthermore, the ^{The} stopper 130 is, ^{at a} at the central portion thereof, ^{provided} secured by the ^{plurality of} hinge ^{plates} (to move up/down) by the cylinder 132. ^{and can be moved up and down}]

The multi-stacker having the above-construction is ^{positioned at intervals} installed with a plurality of tray plates ^{by a predetermined interval} thereby causing the space ^{an increase in required} [to be increased] therefor. Furthermore, because the position of the multi-stacker is controlled by the cylinder, the apparatus ^{has a} become complicated [its] construction.]

Furthermore, it is very difficult to stack the classified device and the classification of the device can not be ^{varied} variable.]

SUMMARY OF THE INVENTION

^{It} Accordingly, the present invention has been invented ^{to} solve the above problems. ^{to} [it] is an object to provide a multi-stacker of a handler, in which a stacker is simplified [its] in construction and [an apparatus becomes small its] size, ^{is small in} to stack a test tray served with

variously classified devices so that correct and rapid stacking ^{operations} (operation) can be accomplished.

To accomplish above object, the present invention provides a multi-stacker of a handler comprising: a stacker frame installed longitudinally on a handler frame and coupled with a side plate; a tray stacking portion for stacking a test tray served with a classified distributed device in the stacker frame; a guide for determining the position of a tray plate placed on the test tray and ^{provided at} (installed) four edges ^(at the test tray) for preventing the tray plate from ^(being deviated) and a tray up/down movement means for moving up and down along the inside of the guide and for unloading the test tray ^{which has been} (served with a classified device). ^{deviating from a predetermined position}

The stacker frame is, at ^a (the) lower portion thereof, ^{provided} (installed) with a support plate, and ^(configured) the support plate is, at ^{an} (the) inside of the lower portion thereof, ^(provided) (installed) with a stopper to move transversely.

The stopper moves transversely by ^{means of} a linear cylinder ^(provided) (installed) at ^{an} (the) upper portion thereof. The stopper is, ^(on an) (at) the entire surface thereof, formed with a protrusion to fix the tray plate.

The tray stacking portion ^(includes) is placed with a plurality of tray plates to classify and stack the test tray served with the classified device.

The tray up/down movement means comprises: ^(having) an up/down movement plate ^(positioned thereon) (placed thereon with) a plurality of tray plates; a LM rail secured ^(at) [its] one side ^(to) with a rack and installed longitudinally at ^(the) lower portion of the up/down movement plate; a LM block installed longitudinally ^(slidably) along the LM rail for sliding; a bracket secured to one side of the LM block and secured to ^(the) lower portion of the handler frame; a motor ^(up and down) provided with a pinion gear for moving ^(via) the up/down movement plate (with) a rack of the LM rail; and a bracket ^(attached to) (inserted with) the motor for rotating the pinion gear.

The up/down movement plate is, at ^a (the) lower portion thereof, connected ^(to a) (with) the top side of the LM rail and is ^(for) (installed) with the support plate for attenuating ^(the) distortion and vibration of the up/down movement plate.

The LM rail is, at ^a (the) lower portion thereof, ^(provided) (installed) with a pair of support

plates for attenuating the shock and vibration of the LM rail.

The guide moves transversely by the linear cylinder for easy control of the test tray to be controlled.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects and aspects of the invention will become apparent from the following description of embodiments with reference to the accompanying drawings in which:

Fig. 1 is a perspective view of a conventional multi-stacker of a handler;

Fig. 2 is a side view of the conventional multi-stacker of Fig. 1;

Fig. 3 is a perspective view of the multi-stacker of the handler according to the present invention;

Fig. 4 is a disassembly perspective view of the multi-stacker for a handler of Fig. 3;

Fig. 5 is a perspective view of an up/down movement means [to move up/down] of a multi-stacker of a handler, according to the present invention;

Fig. 6 is a side view of Fig. 5; and

Fig. 7 is a side view for the construction of the multi-stacker.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Fig. 3 is a perspective view of the multi-stacker of the handler according to the present invention; Fig. 4 is a disassembly perspective view of Fig. 3; Fig. 5 is a perspective view of an up/down movement means [to going up/down] of a multi-stacker of a handler; Fig. 6 is a side view of Fig. 5; and Fig. 7 is a side view for the construction of the multi-stacker.

Referring to Fig. 3 to Fig. 7, a multi-stacker of a handler according to the present invention comprises a stacker frame 12 installed longitudinally on a handler

10 frame and coupled ^{to} [with a side plate 14] ^{each potentially} a tray stacking portion 98 for classifying and stacking a test tray served with a classified device according to the classification in the stacker frame 12 ^{or} guide 16 for determining the position of a tray plate 22 placed on the ~~plurality of~~ test tray and ^{at} installed four edges for preventing the tray plate 22 from being deviated; and a tray up/down movement means 96 ^{is configured to move} for moving up and down along the inside of the guide 16 and for unloading the test tray served with a classified device according to the classification the tray plate 22.

The stacker frame 12 is, at the lower portion thereof, ^{provided} installed with a support plate 31 and the support plate 31 is, at the inside of the lower portion thereof, installed with a stopper 42 to move transversely.

(The stopper 42 moves transversely) by the action of a linear cylinder 44 ^{provided} installed at the upper portion thereof.

The stopper 42 is, at the entire surface thereof, formed with a protrusion to ^{is an} hold the tray plate 22.

The tray stacking portion 98 ^{includes the} is placed with a plurality of tray plates 22 ^{configured} to classify and stack the test tray served with the classified device.

The tray up/down movement means 96 ^{are stacked} comprises: an up/down movement plate 24 ^{on which the} placed thereon with a plurality of tray plates 22; a LM rail 26 ^{secured with} having a rack 28 at its one side ^{thereof} and installed longitudinally at the lower portion of the up/down movement plate 24; a LM block 34 installed longitudinally along the LM rail 26 ^{for sliding} for sliding; a bracket 32 ^{secured} secured to one side of the LM block 34 and secured to the lower portion of the handler frame 10; a motor 38 ^{provided} provided with a pinion gear 36 for moving up/down the up/down movement plate 24 ^{with the} with a rack 28 of the LM rail 26; and a bracket 40 ^{that support} inserted horizontally with the motor 38 for rotating the pinion gear 36.

The up/down movement plate 24 is, at the lower portion thereof, ^{connected to} up and down, the pinion gear 36 being engaged with with the top side of the LM rail 26 and ^{is provided} installed with the support plate 30 for attenuating the distortion and vibration of the up/down movement plate 24.

The LM rail 26 is, at the lower end thereof, ^{provided} installed with a pair of support plates 33 for attenuating the shock and vibration of the LM rail 26.

A ^{more detailed} ~~More detail~~ description ~~for~~ ^{of} the multi-stacker having the above construction follows.

The base 100 of the handler ^{has} ~~is formed with~~ a square-shaped frame and ~~is at the~~ ^{A handler frame 10 is positioned on} an upper portion thereof ^{placed with a handler frame 10}.

The handler frame 10 is, at ^{the} ~~the~~ right upper portion thereof, installed with the multi-stacker 102. The multi-stacker 102 serves to classify and stack each test tray served with a classified device after test.

The ^{of the} multi-stacker 102 ~~is installed with the~~ ^{has a} ~~stacker frame 12~~ ^{provided} having a four sides-opened box shape and is, at right and left sides thereof, ^{provided} ~~installed~~ with a pair of support plates 31. The support plate ^{31 are} ~~22~~ is, at ^{the} ~~the~~ lower portion thereof, ^{provided} ~~installed~~ with ^{the stopper for fixing} the ascending tray plates 22.

Furthermore, the stopper 42 is, ^{on an} ~~at the~~ entire surface thereof, ^{provided} ~~formed~~ with ^{the} a protrusion 43 and is, at ^{the} ~~the~~ upper portion thereof, ^{which moves for moving} ~~installed~~ with ^{connected to} ~~the~~ linear cylinder 44 ^{toward} right and left.

Meanwhile, the support plate 31 is, at ^{the} ~~the~~ lower portion thereof, installed with ^{the} ~~the~~ side plate 14, facing each other ^{from the} ~~from~~ right and left, and is, at ^{the} ~~the~~ inside thereof, ^{provided} ~~installed~~ with ^{the} ~~the~~ tray stacking portion 98 for stacking the tray plates 22 formed with ^{the} ~~the~~ locking groove 45 ^{on} ~~at~~ both sides. ^{which are each}

The tray stacking portion 98 is constructed so that the stacker frame 12 is, at four edges thereof, secured with ⁱⁿ ~~the~~ guide 16, ^{the} ~~the~~ sensor 20 is secured by the sensor bracket 18 ^{to be secured} at one side of the guide 16. Furthermore, the tray stacking portion 98 is constructed so that a plurality of tray plates 22 ^{may be} ~~is continuously~~ stacked along ^{an} ~~the~~ inner surface of the guide 16 ^{for up/down movement} ~~to move up/down~~, and is, at ^{the} ~~the~~ lower portion thereof, ^{provided} ~~installed~~ with the tray up/down movement means 96 to support the tray plates 22 and to move up/down for classifying and stacking the test tray ^{served with the} ~~served with the~~ classified device ^{between the tray plates 22}.

Furthermore, it is easy to attach or detach the tray plate ^{so} ~~so~~ that the number of classification level ^{for stacking the test tray} ~~for stacking the test tray~~ can be changed ^{in variety}.

The tray up/down movement means 96 supports the tray plates 22. The up/down movement plate 24 is, at ^athe lower portion thereof, secured with the LM rail 26 and is, at ^{an}the upper end thereof, ^{provided}installed with the support plate 30 to connect the up/down movement plate 24 to the LM rail 26 and to ^{reduce}attenuate ^(the)distortion and vibration of the up/down movement plate 24.

The LM rail 26 is, at one side thereof, secured with the rack 28 formed with a plurality of gears, and is, at ^{the}other side thereof, ^{provided with}installed the LM block 34 thereby to move ^{up/down}the LM rail 26. The LM block 34 is secured to the handler frame 10. Furthermore, the LM rail 26 is, at ^{up/down}the lower end thereof, ^{provided}installed with a pair of support plates 33 to attenuate ^(the)vibration and shock of the LM rail 26.

~~At this time,~~ ^{on}the motor 38 is installed ^{configured to be rotated}at the bracket 40 secured to the handler frame 10. The pinion gear 36 ^{for rotating}by the rotating power from the motor 38 is engaged with the rack 38.

Accordingly, the rack 28 ^{is moved}~~repeats~~ up/down ~~movement~~ by the rotation of the pinion gear 36.

The operation of multi-stacker having the above-construction will now be described.

^AThe ^atested device at ^athe test site is separated ^{according to classification as}a good device ^{versus}from a bad device ^{and is classified according to the classification.} When ^athe test tray ^{is}served with ^{the}the classified device, the motor 38 drives the pinion gear 36 to rotate thereby ^{to move up}the rack 28 ^{up}.

At this time, the LM rail 26 secured with the rack 28 is guided by the LM block 34 to move up/down, and, at the same time, the tray plates 22 ^{are moved}placed on the up/down movement plate 24 ^{is ascended}toward the inside of the stacker frame 12. ^{positioned}

^{The}The ascended tray plate 22 ^{of stopper 42 is}is its protrusion 43 ^{installed on the support plate 31}inserted ^{and secured to}into the locking groove of an ascended tray plate 22. ^{locking groove 45 by the stopper 42 installed at the support plate 31.}

Because the stopper 42 ^{is}moves ^aforward and backward in right and left directions ^{the}

by the linear cylinder 44, the linear cylinder 44 operates the stopper 42 to move forward when the tray plate 22 on the up/down movement plate 24 ascends.

At this time, the protrusion 43 of the stopper 43 is coupled with the locking groove 45 of the tray plate 22 thereby ^{ing} secure the upper tray plate 22 of the desired tray plate 22 among the classified tray plates 22.

Meanwhile, other tray plates 22 ^{are} ^d moves down by a predetermined distance along the up/down movement plate 24, the test tray is placed on the tray plate 22 and, at the same time, the up/down movement plate 24 again ascends to contact with the tray plate 22 so that the stopper 42 moves backward to release the tray plate 22.

Accordingly, the up/down movement plate 24 is moved down with the test tray.

If the test tray ^{is to be} ^a serves with level II of the classified device, the tray plate 22 disposed at the highest portion is secured by the stopper, the test tray is placed on the second tray plate 22 to move down. By repeating the above operations the test tray served with the classified device can be unloaded.

According to the present invention having the above description simplifies its construction and ^{is easily} easy stacks a classified device, as well as sets its position correctly and rapidly.

Having described specific preferred embodiment ^s of the invention with reference to the accompanying drawings, it is to be understood that various changes and modifications may be effected therein by one skilled in the art without departing from the scope or spirit of the invention as defined in the appended claims.

ABSTRACT OF THE DISCLOSURE

[The present invention relates to a ^Amulti-stacker ^{for} of a handler ^{is provided} in which after a device served in a test tray is ^{tested at} contacted with a test of a test site [to be tested] and is classified [thereby to unload on] each test tray according to the classification. The [present invention provides a] multi-stacker ^{for} of a handler ^{is unloaded} [including] a stacker frame installed longitudinally on a handler frame and coupled ^{to} ^{includes} with a side plate, a tray stacking portion for stacking a test tray served with a classified [distributed] device in the stacker frame; a guide for determining ^a the position of a tray plate placed on the test tray and installed ^{at} ^{four} edges for preventing the tray plate from ^{an} being deviated; and a tray up/down movement means for moving up and down along the inside of the guide and for unloading the test tray served with a classified device.

~~test trays~~

deviating from
a correct position
predetermined